AMENDMENTS

In the Claims

Please replace the currently pending claims with the following clean version of the entire set of pending claims, in accordance with 37 C.F.R. §1.121(c)(1)(i). Cancel all previous versions of any pending claim.

A marked up version showing amendments to any claims being changed is provided in one or more accompanying pages separate from this amendment in accordance with 37 C.F.R. § 1.121(c)(1)(ii). Any claim not accompanied by a marked up version has not been changed relative to the immediate prior version, except that marked up versions are not being supplied for any added claim or canceled claim.

1 50. An image processing apparatus for receiving bitstream data and processing said bitstream data to provide video stream image data to a display device, comprising:

a display input processor (DIP) coupled to a databus, said DIP comprising an input data connector and a first plurality of processing modules configured to receive bitstream data input and reconstruct said input to generate DIP outputs;

a display output processor (DOP) coupled to said databus, said DOP comprising a second plurality of processing modules configured to process said DIP outputs for generating DOP outputs, said second plurality comprising a geometric transformation (GT) module and a post GT filtering module; and

a buffer memory, coupled to said databus, configured to store said DIP outputs and said DOP outputs, and to provide said video stream image data to said display device.

2 51. The apparatus of claim 50 wherein said DOP comprises a display map memory (DMM).

3 52. The apparatus of claim 51 wherein said DMM is configured to store system configuration information which includes intensity values for setup of said display device.

53. The apparatus of claim 50 wherein said geometric transformation (GT) module is configured to geometrically transform said DIP inputs.

54. The apparatus of claim 53 wherein said GT module comprises:

a spatial transformation module configured to redefine spatial relationships between image pixels;

an alignment and rotation correction module configured to reposition image pixels;

a focus correction module configured to correct image defocus; and

a distortion correction module configured to correct image distortions.

55. The apparatus of claim 54 wherein said alignment and rotation correction module is configured to rotate images.

56. The apparatus of claim 54 wherein said focus correction module is configured to correct said image for defocus resulting from image deformation and from display optics.

57. The apparatus of claim 54 wherein said spatial transformation module is configured to use frame information and motion tracking information from multiple input images to increase image resolution.

9 8

58. The apparatus of claim 57 wherein said spatial transformation module is configured to select motion tracking information from either a compressed bitstream or a motion estimator output.

10 4

59. The apparatus of claim 53 wherein said GT module is configured to improve skew, tangential symmetry, aspect angle, and scale-related distortions of said display images.

11 4

60. The apparatus of claim 53 wherein said GT module is configured to correct environment-introduced image artifacts.

12 4

61. The apparatus of claim 53 wherein said GT module is configured to correct artifacts resulting from non-uniformity of the display device.

13 4

62. The apparatus of claim 53 wherein said GT module comprises a texture mapping module.

14 4

63. The apparatus of claim 53 wherein said DOP is configured to use a mathematical formula for providing DOP outputs suitable for a panoramic projection.

64. The texture mapping module of claim 63, where said module is configured to use texture mapping to perform transitions for multi□picture displays.

65. The apparatus of claim 53 wherein said GT module comprises a multi□frame correlation module.

66. The apparatus of claim 65 wherein said multi□frame correlation module is configured to select motion compensation information from either a selected display image or a motion estimator output.

D2 cont'd

67. The apparatus of claim 50 wherein said DIP is configured to receive data as a coded bitstream, said bitstream comprising image object information, image object depths, and image motion tracking information.

68. The apparatus of claim 67 configured to provide image data for a 3D and/or a panoramic display device.

69. The apparatus of claim 68 configured to use said image object information to reposition objects in output coordinates of said panoramic display device.

D

21 19

70. The apparatus of claim 68 configured to output image data to film.

22 19

71. The apparatus of claim 68 configured to receive a coded input that represents two images and use said coded input to present a 3D stereoscopic image on said display device.

23 1

D2 cont. 72. The apparatus of claim 50 configured to simultaneously receive multiple video streams and process such streams to provide an image from each video stream in a single display using Picture-in-Picture and windowing controls.

24 23

73. The apparatus of claim 72 wherein said GT module is configured to perform transition effects between the different video streams, such transition effect including fades, blends, wipes and warps.

25 1

74. The apparatus of claim 50 wherein said DIP comprises an image reconstruction module configured for performing multiframe reconstruction to increase image resolutions.

26 25

D3 75. The apparatus of claim 74, wherein said image reconstruction module is configured to use motion estimation vectors from an input bitstream to correlate multiple images.

D

76. An apparatus configured for processing bitstream data to form video stream image data for use in a display system, comprising:

a display device, coupled to said display system, for viewing image data;

a geometric transformation GT module coupled to said display device, said GT module configured to precondition said bitstream data using geometric transformations to compensate for characteristics of said display device; and

a temporal gamma processing TGP module coupled to said display device, said TGP module configured to independently determine an output intensity value for each color component output to said display device.

77. The TGP module of claim 76 comprising a plurality of look□up tables, wherein said TGP is configured to use at least one of said plurality of tables for determining color correction.

78. The apparatus of claim 76 wherein said geometric transformation module comprises a spatial transformation module configured for redefining spatial relationships between image pixels derived from said bitstream information.

30 27

79. The apparatus of claim 76 wherein said geometric transformation module comprises an alignment and rotation correction module configured for repositioning said image pixels.

31 27

80. The apparatus of claim 76 wherein said geometric transformation module comprises a focus correction module configured for correcting image defocus.

32 27

81. The apparatus of claim 76 wherein said geometric transformation module comprises a distortion correction module configured for correcting image distortions.

D4 cont'd

33 27

82. The apparatus of claim 76 wherein said geometric transformation module comprises a multi-frame correlation module configured for performing motion-compensated frame rate conversion.

34 27

83. The apparatus of claim 76 wherein said geometric transformation module is configured to improve skew, tangential symmetry, aspect angle, and scale-related distortions of said image data.

D

84. A method for processing bitstream information to form images from video stream image data for use in a display system having a display device, comprising:

receiving said bitstream information into a display input processor (DIP);

processing said received bitstream information to generate DIP outputs;

receiving said DIP outputs into a display output processor (DOP);

processing said DIP outputs with a geometric transformation (GT) module to generate DOP outputs;

directing said DOP outputs to a buffer memory module; and

providing images based on said DOP outputs to said display device.

D4 cont'd

85. The method of claim 84 wherein processing said DIP output comprises said geometric transformation module preconditioning said DIP outputs using geometric transformations to compensate for characteristics of said display system.

86. The method of claim 85 wherein processing said DIP outputs comprises using a spatial transformation module for redefining spatial relationships between image pixels derived from said DIP outputs.

D

87. The method of claim 85 wherein processing said DIP outputs comprises using an alignment and rotation correction module for repositioning image pixels derived from said DIP outputs.

88. The method of claim 85 wherein processing said DIP outputs comprises using a focus correction module for correcting image defocus in image data contained within said DOP outputs.

D4 cont'd

89. The method of claim 85 wherein processing said DIP outputs comprises using a distortion correction module for correcting image distortions in image data contained within said DOP outputs.

90. The method of claim 85 wherein processing said DIP outputs comprises using a multi-frame correlation module for performing motion-compensated frame rate conversion in image data contained within said DOP outputs.

91. The method of claim 85 wherein processing said DIP outputs comprises improving skew, tangential symmetry, aspect angle, and scale-related distortions in image data contained within said DOP outputs.

D

92. The method of claim 84 wherein processing said received bitstream information to generate DIP outputs comprises processing with an image reconstruction module that utilizes or masks motion estimation vectors based on matching accuracy of motion estimation blocks associated with said motion estimation vectors.

93. The method of claim 92 wherein utilizing motion estimation vectors comprises processing until sub-block motion estimation is discerned.

D4 cont'd

94. The method of claim 92, wherein utilizing motion estimation vectors comprises using enhanced matching processing techniques which include rotation, scale and sheer techniques.

95. The method of claim 92 wherein processing with an image reconstruction module comprises processing bitstream information comprising multiple images from multiple cameras.

96. (Amended) The method of claim 84 wherein processing said DIP output comprises utilizing a temporal gamma processing (TGP) module to independently determine, for each color component, an intensity value to output to said display device.

D

D4 cont.

97. The method of claim 96 wherein utilizing a TGP module to determine an intensity value comprises utilizing a desired intensity value and a previous frame intensity value.

D